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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/664,649 | 09/17/2003 | Robert John Heeg | GE138084 | 4623 |
| 29827 | 7590 | 04/19/2005 | EXAMINER | |
| FRANCIS L. CONTE, ESQ. 6 PURITAN AVENUE SWAMPSCOTT, MA 01907 | | | HANAN, DEVIN J | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 3745 | |

DATE MAILED: 04/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 10/664,649 | Applicant(s) HEEG ET AL. | |
| | Examiner Devin Hanan | Art Unit 3745 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2,11 and 12 is/are rejected.
- 7) ☒ Claim(s) 3-10 and 13-27 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glynn et al. (U.S. Patent 6,206,638) in view of Rinck et al. (U.S. Patent 6,554,572) and Sylvestro et al. (U.S. Patent 5,368,441).

Glynn et al. discloses a turbine blade (10) with an airfoil integrally joined to a supporting dovetail (14);

an airfoil including opposite pressure (16) and suction (18) sidewalls extending chordally between opposite leading and trailing edges and in span from a root to a tip, an internal cooling circuit (36), and thermal barrier coating covering external surfaces of the airfoil pressure and suction sidewalls (col. 8 lines 11-15);

a cooling circuit including a first flow passage (70) disposed directly behind a leading edge, followed in turn by a second flow passage (40C) separated therefrom by a bridge (71) integrally joined to said pressure and suction sidewalls;

a bridge including a row of impingement apertures (74) for discharging air from said second passage into a first passage in impingement behind said leading edge;

a suction sidewall including a row of diffusion film (44) cooling first holes extending there through in flow communication with a first passage, and said first holes being disposed through said suction sidewall at a compound inclination angle (col. 2 lines 30-36) extending through the thermal barrier coating;

an airfoil tip including squealer ribs (29) extending outwardly from said pressure and suction sidewalls forming a recessed tip floor there between; the tip floor including a row of floor holes (59) shown along the suction sidewall inboard of the squealer rib;

a pressure sidewall includes an axial row of tip holes (uppermost two holes 48) disposed below said squealer rib thereat.

Glynn et al. does not disclose quadrilateral cross section outlet holes with a generally teardrop outlet shape or rows of floor holes along both the pressure and suction sidewalls of said squealer ribs.

However, Rinck et al. does disclose rows of floor holes along both the pressure and suction sidewalls (figure 3) of the squealer ribs for the purpose of combating high temperatures (col. 1 lines 40-43).

Additionally, Sylvestro et al. discloses quadrilateral cross section (figure 5) outlet holes with a generally teardrop outlet shape (figure 3) for the purpose of forming a film of cooling fluid with an organized flow(col. 3 lines 5-7 and lines 20-28).

Since Glynn et al., Rinck et al. and Sylvestro et al. are all from the same field of endeavor, the purposes disclosed by Rinck et al. and Sylvestro et al. would have been recognized in the pertinent art of Glynn et al. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a row of floor holes

along the pressure sidewall inboard of the squealer rib as taught by Rinck et al. to the tip of the turbine blade of Glynn et al. to combat high temperatures and modify the film cooling holes of Glynn et al. to have a quadrilateral cross section and a generally teardrop shape of Sylvestro et al. for film cooling with an organized flow.

Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Glynn et al. (U.S. Patent 6,206,638) in view of Sylvestro et al. (U.S. Patent 5,368,441).

Glynn et al. discloses a turbine blade (10) with an airfoil integrally joined to a supporting dovetail (14);

an airfoil including opposite pressure (16) and suction (18) sidewalls extending chordally between opposite leading and trailing edges and in span from a root to a tip, an internal cooling circuit (36); and

a cooling circuit including a first flow passage (70) disposed directly behind a leading edge, followed in turn by a second flow passage (40C) separated therefrom by a bridge (71) integrally joined to said pressure and suction sidewalls;

a bridge including a row of impingement apertures (74) for discharging air from said second passage into a first passage in impingement behind said leading edge;

a suction sidewall including a row of diffusion film (44) cooling first holes extending there through in flow communication with a first passage, and said first holes being disposed through said suction sidewall at a compound inclination angle (col. 2 lines 30-36);

Glynn et al. does not disclose quadrilateral cross section outlet holes with a generally teardrop outlet shape or rows of floor holes along both the pressure and suction sidewalls of said squealer ribs.

However, Sylvestro et al. discloses quadrilateral cross section (figure 5) outlet holes with a generally teardrop outlet shape (figure 3) for the purpose of forming a film of cooling fluid with an organized flow(col. 3 lines 5-7 and lines 20-28).

Since Glynn et al. and Sylvestro et al. are from the same field of endeavor, the purpose disclosed by Sylvestro et al. would have been recognized in the pertinent art of Glynn et al. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the film cooling holes of Glynn et al. to have a quadrilateral cross section and a generally teardrop shape of Sylvestro et al. for film cooling with an organized flow.

Allowable Subject Matter

Claims 3-10 and 13-27 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Devin Hanan whose telephone number is 571-272-6089. The examiner can normally be reached on Monday through Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on 571-272-4820. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Devin Hanan
Patent Examiner
Art Unit 3745



EDWARD K. LOOK
SUPERVISORY PATENT EXAMINER
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4/6/05